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Western Spruce Budworm Population
Suppression with Insecticides in Northeastern Oregon ^{1/}

by
Bruce B. Hostetler

In the Blue Mountains of eastern Oregon, western spruce budworm (WSBW), Choristoneura occidentalis, defoliation was detected in 1980 during the aerial survey for the first time since the outbreak in the 1940's and 1950's. Significant defoliation covered about 5,000 acres in 1980 and increased to 300,000, 1.5 million, and 2.4 million acres in 1981, 1982, and 1983, respectively. Defoliation acreages for 1984 have not yet been tallied but are expected to be about the same as those of 1983. During the 1983 and/or 1984 surveys, WSBW defoliation was also detected on or near the Okanogan and Wenatchee National Forests in Washington and the Mt. Hood and Deschutes National Forests in Oregon.

In 1982, about 178,000 acres of the WSBW infestation were treated with insecticides, 169,000 with carbaryl and 9,000 with acephate. In 1983, another 524,000 acres were treated: 502,000 with carbaryl, 10,000 with mexacarbate, and 12,000 with Bacillus thuringiensis. No insecticide treatment other than a small 800-acre field test of B.t. was carried out in 1984.

The objective of the 1982 and 1983 suppression projects was to reduce WSBW populations throughout the current outbreak period. Economics were carried by the fact that, on many stands in the Blue Mountains, understory fir will be grown as the next crop tree. When these stands are eventually regenerated, managers will strive for more species diversity and discriminate against true fir and Douglas-fir and for non-host species. Several key assumptions made in the analysis of the WSBW situation in Region 6 were: (1) insecticide treatment will reduce populations throughout current outbreak period, (2) timing of next outbreak is independent of treatment or no treatment during this outbreak, and (3) managers will become more aware of WSBW and will strive to implement forest management practices which will, to the best of our knowledge, ameliorate the impacts of WSBW as well as other insect and/or disease pests.

The short-term (14-day post-treatment) larval density threshold (7 larvae per 100 buds) was obtained on all carbaryl-treated areas (169,000 acres) in 1982, but not on the 9,000 acres treated with acephate. During summer 1983, one year after treatment, defoliation was readily visible in the acephate-treated areas and on portions of two of the carbaryl-treated units. In 1984, defoliation was visible on about 75 percent of the 1982 treatment area. Much of this defoliation, even though visible, appeared to be less intense than that in untreated areas.

In 1983, the targeted 14-day post-treatment density threshold was set at a lower level (1.5 larvae per 45-cm branch) due to concern that treatment may not have been effective in all 1982-treated areas even though treatment on all but 9,000 acres was deemed successful. This target was met on 62 percent of

^{1/} Presented at CANUSA Workshop: Silvicultural Strategies for Western Spruce Budworm, August 28-30, 1984, Missoula, Montana.

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the carbaryl-treated areas and on none of the areas treated with mexacarbate or Bacillus thuringiensis. In 1984 defoliation was visible on about 25 percent of the area within units that met the target and on more than 50 percent of the area within those that didn't meet the target. Most of the defoliation detected within treatment units was less intense than that of nearby untreated areas. It is not known what will happen in these areas over the next several years.

The results of aerial defoliation surveys of 1982 and 1983 treatment areas certainly cast some doubt as to the validity of one of the key assumptions. Namely, that WSBW populations treated with insecticides early in the outbreak would be reduced to endemic levels throughout the current outbreak period. The reasons for this apparent resurgence of the populations in some of the treated areas are not fully known. Some suspected reasons are: (1) poor application of insecticide; (2) poor weather conditions such as rain and wind during and/or soon after insecticide application; (3) movement of WSBW into treated areas from untreated stream buffers and adjacent untreated areas, the latter due in part to poor definition of entomological units during the planning phase; and (4) increase of residual WSBW populations in treated areas. An aerial survey of areas treated in 1982 and 1983 will be done annually to monitor WSBW-caused defoliation. Collection of defoliation data on the ground is not planned for these areas.

It is not known at this time what future actions, if any, will be taken regarding WSBW in northeastern Oregon. Forest Pest Management personnel are working with land managers in updating the analysis of the situation, incorporating any new information that is available. Results of this analysis update will be known early in 1985.

Regardless of the results of this new analysis, results of the 1982 and 1983 projects have indicated that there is little margin for error with the insecticides available for use today. To increase the probability of success if areas are treated in the future, the following guidelines should be adhered to:

1. Entomological units which are treated must be large and be bounded by high ridges or definite breaks in host type.
2. There must be no buffer (i.e., untreated) strips left within treated areas.
3. Insecticide application must not take place if rain is expected within 8 hours after treatment.
4. Strict controls must be placed on the applicator.